



The Impacts of Hurricanes Katrina and Rita on Public Safety in Louisiana – A Spatial and Temporal Analysis of Reported Crimes

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Newspaper Headlines

Mayor wants FEMA to pay for police OT / The extra hours sought in the face of a crime surge (*Houston Chronicle, Dec 27, 2005*)

State cops, Guard to remain in N.O. (*The Times-Picayune, Dec 14, 2006*)

N.O. murders hit 161 for year 3 men are shot to death on New Year's Eve in city (*The Times-Picayune, Jan 02, 2007*)

Study: Murder rate is even higher
Figures make N.O. the deadliest city (*The Times-Picayune, March 12, 2007*)



Causes for Migration

<i>Responsibilities</i>	<i>Mostly natural</i>	<i>Mixed</i>	<i>Mostly anthropogenic</i>
Geographical extent			
Local	Volcano eruptions, quakes	Floods	Industrial accidents, development projects
Regional	Tsunami	Land degradation	Deforestation
Global	Desertification		Sea-level rise

This research is taken from a presentation by François Gemenne- CEDEM, University of Liège (LSU, 28 February 2007)



Migration of New Orleanians after Katrina

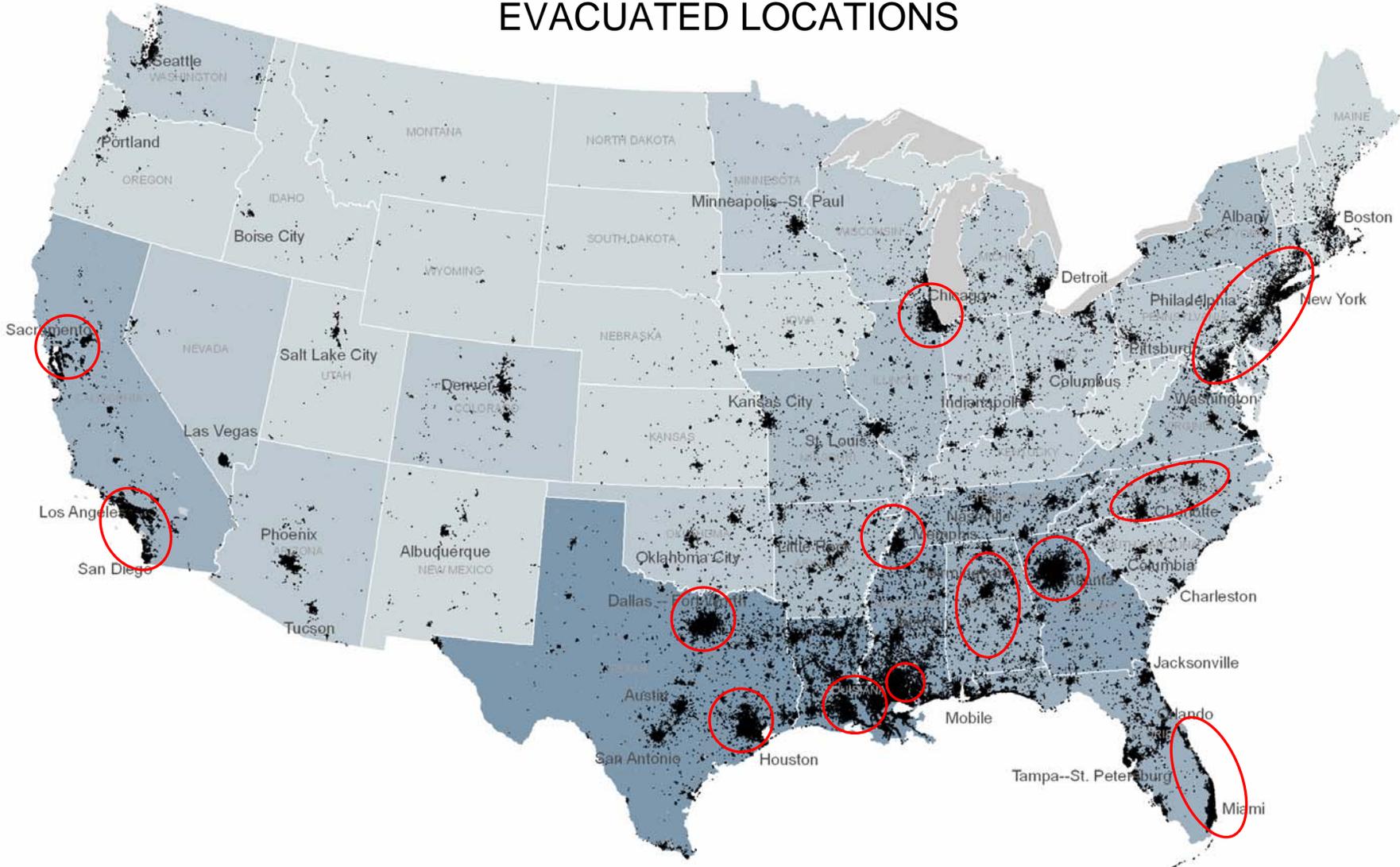
- Two most significant results:
 - The most vulnerable were the most affected
 - Migration patterns are extremely diverse
 - However, the term ‘refugee’ is unanimously rebutted



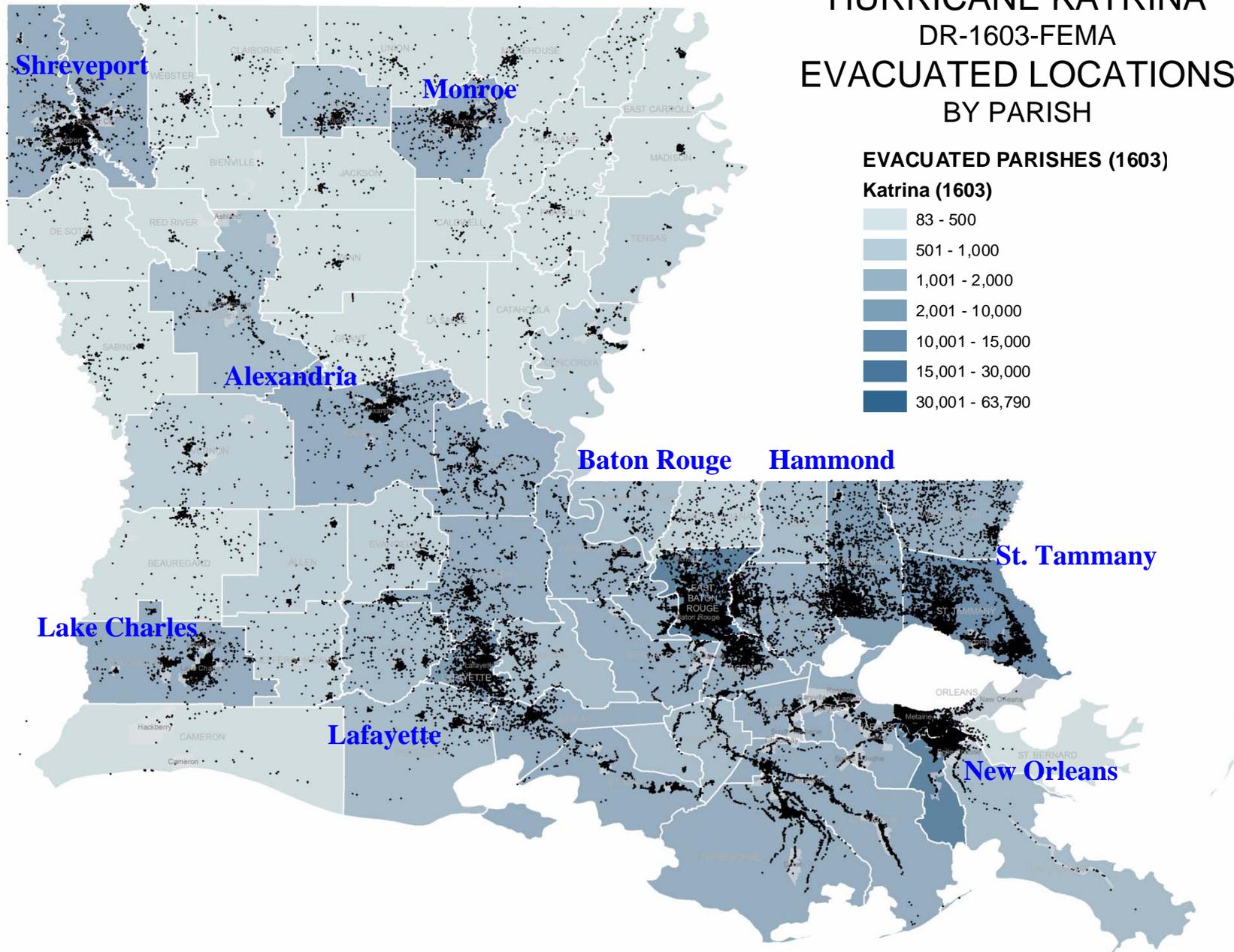
Migration patterns extremely diverse

- Some people traveled very far away, others stayed relatively close.
- Some traveled on their own, others were evacuated.
- Some stayed with friends/relatives, others stayed in hotels/rented properties.
- Some could choose where they were going, others not.
- And some did not move at all.

HURRICANE KATRINA DR-1603-FEMA EVACUATED LOCATIONS



HURRICANE KATRINA DR-1603-FEMA EVACUATED LOCATIONS BY PARISH



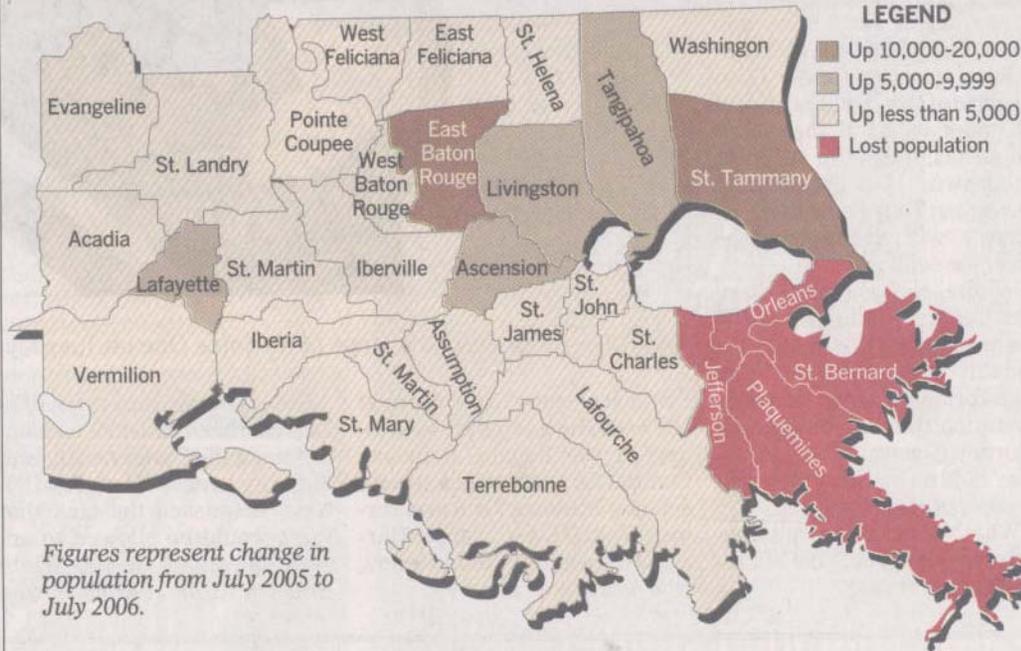


Most vulnerable were far less off

- Many were stranded in the city.
 - Those evacuated had no choice of their destination (quite unique).
 - This affected their ability to cope while away.
 - Tend to blame Government and FEMA more severely.
- > Katrina was also, and maybe most of all, a social disaster.

The Baton Rouge Advocate (March 22 2007)

Change in population since hurricanes Katrina and Rita



July 2005 July 2006

Orleans	452,170	223,388
St. Bernard	65,147	15,514
East Baton Rouge	409,809	429,073

26 Parishes with population gains

POPULATION CHANGE	% CHANGE	POPULATION CHANGE	% CHANGE	POPULATION CHANGE	% CHANGE			
E. Baton Rouge	19,264	4.7	Iberia	1,297	1.7	Evangeline	449	1.3
St. Tammany	10,791	4.9	Acadia	1,210	2.0	Assumption	364	1.6
Tangipahoa	6,985	6.6	St. Martin	1,113	2.2	Pointe Coupee	360	1.6
Ascension	6,888	7.6	W. Baton Rouge	829	3.8	West Feliciana	350	2.3
Lafayette	6,464	3.3	Iberville	814	2.5	East Feliciana	219	1.1
Livingston	5,847	5.4	Vermilion	754	1.4	Plaquemines	-6,391	-22.1
St. John	2,387	5.2	St. James	690	3.3	Jefferson	-19,688	-4.4
Terrebonne	2,254	2.1	St. Mary	654	1.3	St. Bernard	-49,633	-76.2
St. Charles	2,207	4.4	St. Helena	621	6.1	Orleans	-228,782	-50.6
St. Landry	1,888	2.1	Washington	473	1.1	LOUISIANA	-219,563	-4.9
Lafourche	1,644	1.8						



Migration of Criminals after Hurricanes Katrina and Rita

- Impact of disaster on public safety – not much literature
- Various theories may be applicable
 - **Strain Theory**
 - High motivations for crime
 - Homelessness, forced living arrangements, lack of resources, unemployment
 - Low constraints
 - Conformity reduced through relocation, loss of support networks, etc.
 - Reduced external control



Migration of Criminals after Hurricanes Katrina and Rita

- **Deterrence frameworks**
 - Criminal activities will increase because police is occupied with non-criminal activities rather than direct crime control, (e.g., Houston).
- **Routine activities (or opportunity) theory**
 - Unguarded possessions are left behind by evacuating residents; this creates opportunities for criminals.
- **Theories of social disorganization**
 - Absence or breakdown of formal and informal social controls leads to increased criminality

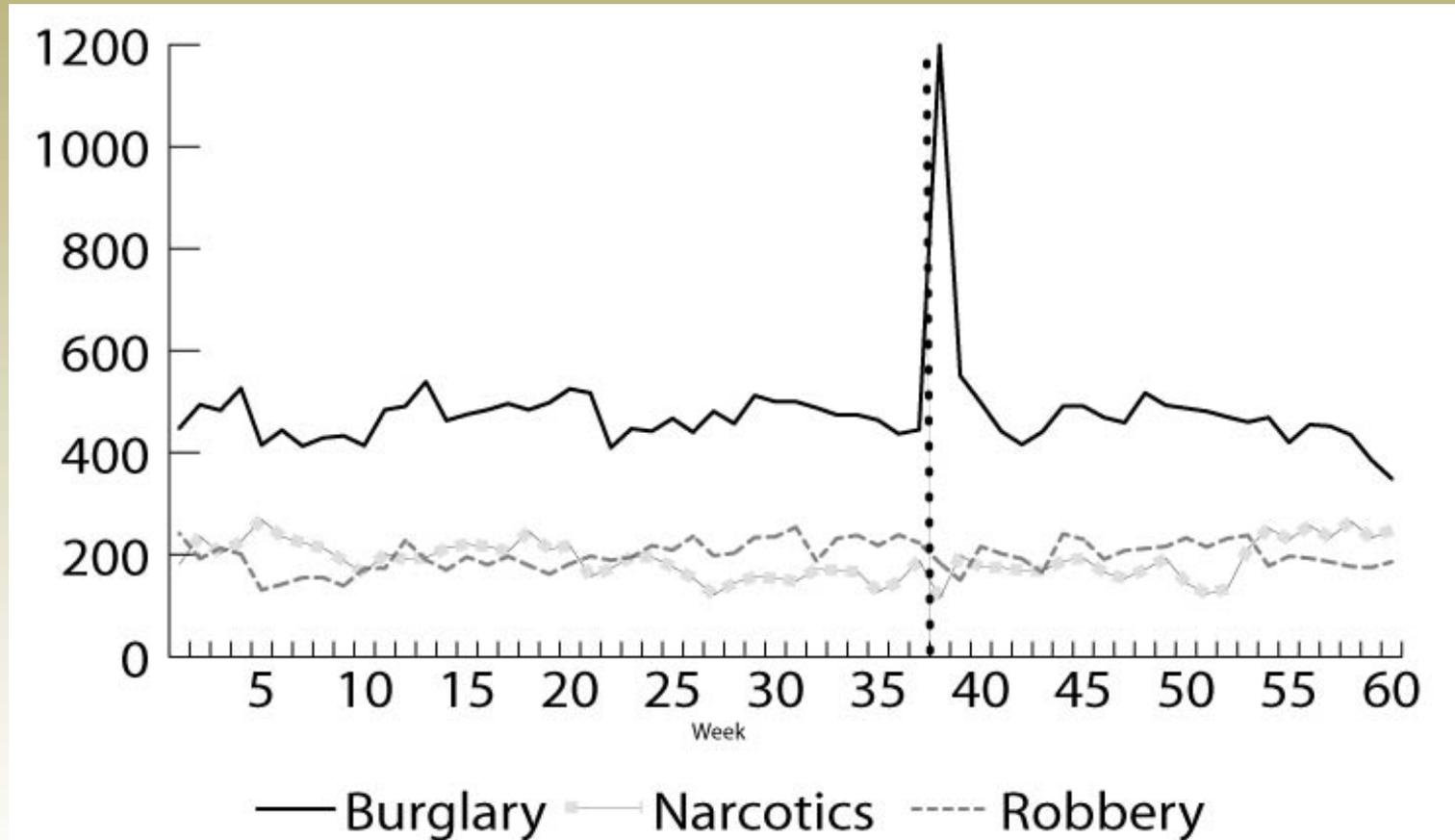


Impact of Hurricane Rita on Crime Trends in Houston

- Approximately 40% of population evacuated.
- Only short-term impacts on opportunity driven crime such as burglary.
- High minority population super-neighborhoods had significant short-term increases in burglaries.



Houston Weekly Crime Counts (January 2005 – February 2006)

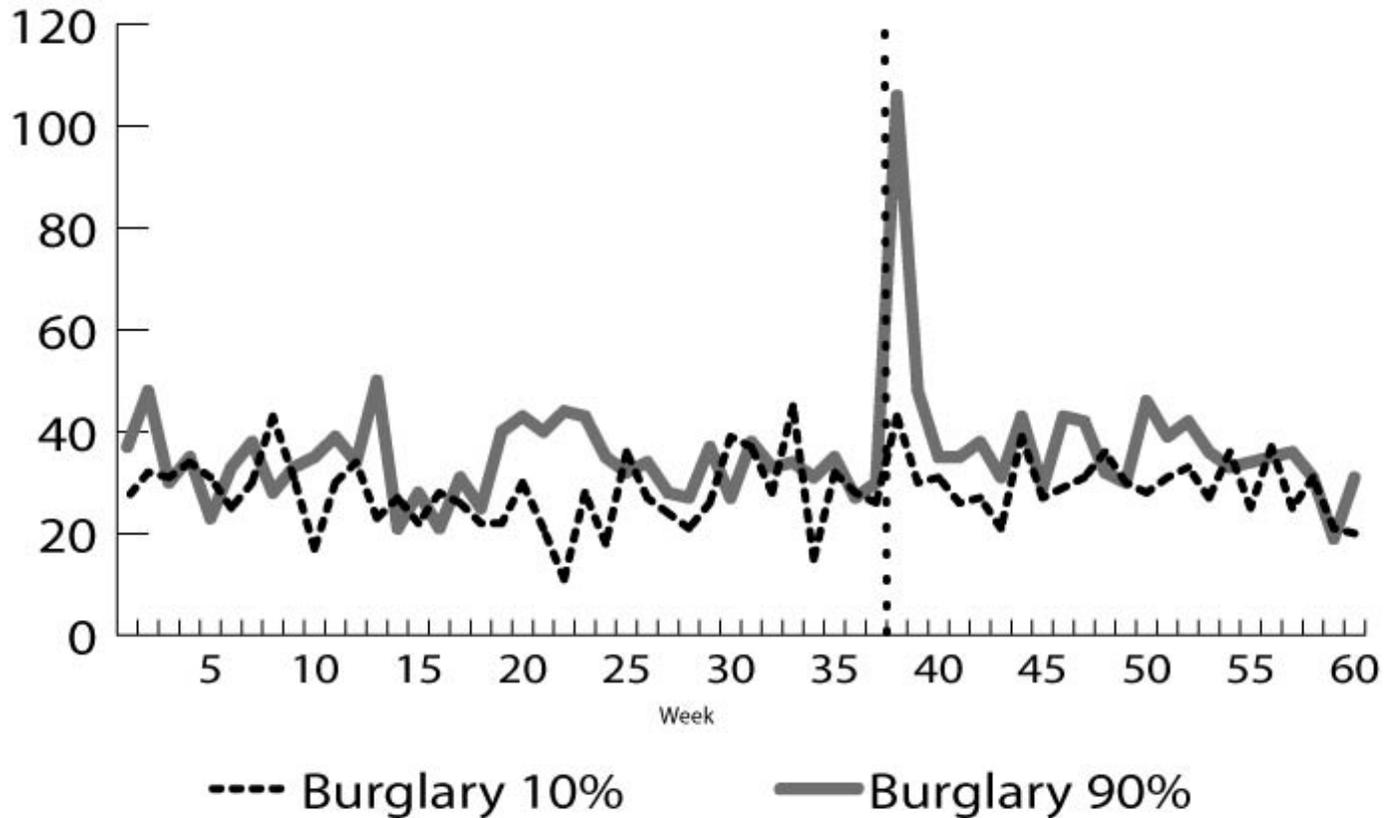


Dotted Line indicates Hurricane Rita
Source: Houston Police Department
Crime Count Data

This research is taken from a manuscript reviewed for *Social Science Computer Review* (Nov 2006)



Houston Burglary Crime Counts in low and high population Black super-neighborhoods

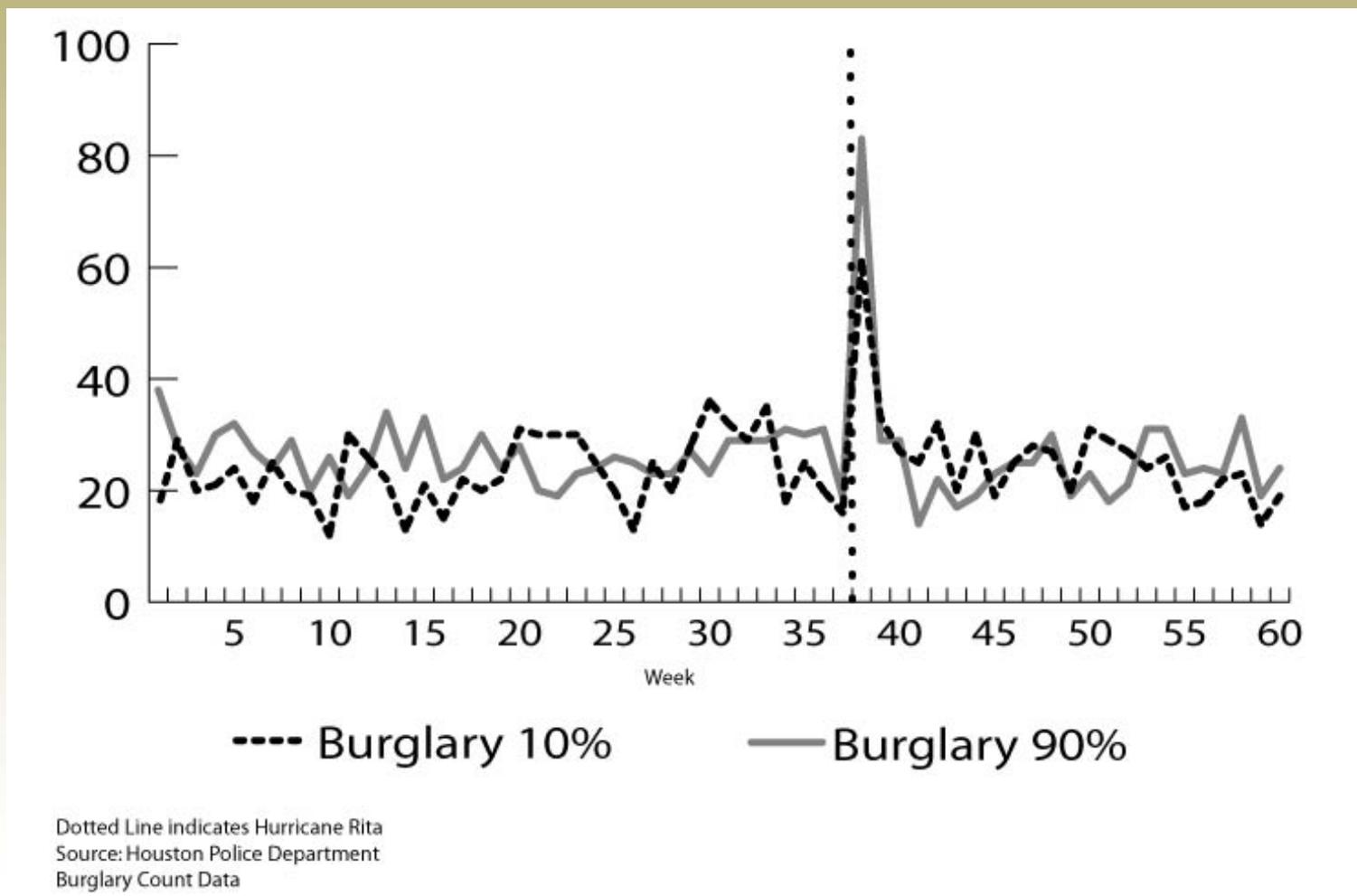


Dotted Line indicates Hurricane Rita
Source: Houston Police Department
Burglary Count Data

This research is taken from a manuscript reviewed for *Social Science Computer Review* (Nov 2006)



Houston Burglary Crime Counts in low and high population Hispanic super-neighborhoods



This research is taken from a manuscript reviewed for *Social Science Computer Review* (Nov 2006)



Crime Data Used in this Research

- Index Crime from Uniform Crime Reporting (UCR)
 - 2000 – 2006 (partial), for all 64 Parishes
 - Homicide, Rape, Robbery, Aggrevated Assault, Simple Assault, Burglary, Larceny, Vehicle Theft
- Crime data are provided by the Louisiana Commission on Law Enforcement



Data Quality Issues

- 162 different Jurisdictions for 64 Parishes

East Baton Rouge Parish

- East Baton Rouge Sheriff's Department
- Baton Rouge Police Department (municipal)
- Zachary Police Department (municipal)
- Department of Public Safety (DPS) Police/State Capitol Detail
- Louisiana State University Police Department
- Southern University Police Department

Orleans Parish

- New Orleans Police Department
- Delgado Community College Police Department
- Southern University New Orleans Police Department
- University of New Orleans Police Department
- Tulane Police Department
- LSU Health Sciences Police Department



Problem with multiple Jurisdictions in one Parish

- Because it is difficult to get information about
 - Physical size
 - Population totals for each jurisdiction
- And no population updates for each jurisdiction exist, then
- If jurisdiction does not submit crime data, it is difficult to calculate accurate crime rate(s) for remaining jurisdiction(s) in the Parish.
- Mostly an issue for larger urban Parishes (Baton Rouge, Orleans, etc.)



Data Quality Issues

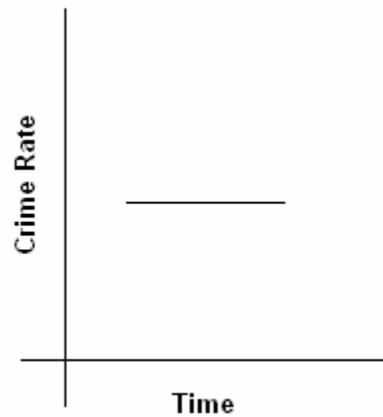
- Missing reports
 - Single jurisdiction in multiple jurisdiction Parish
 - Entire Parish
- E.g.
 - **June 1 2006 - end:** No reports for 18 Parishes (28.1% of total)
 - **All 2005:** No reports for entire or for part of the year for 31 Parishes (48.4% of total)
- Some crime rates are based on population estimates



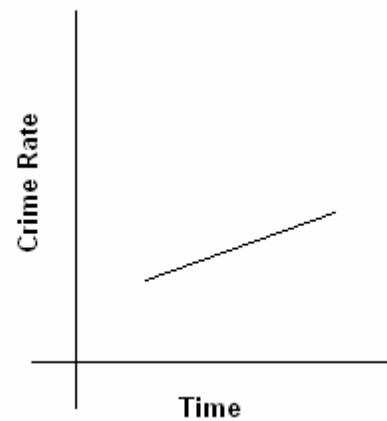
Time Series Analysis

- Composed of different components
 - Trend
 - Cyclical
 - Seasonal
 - Intervention

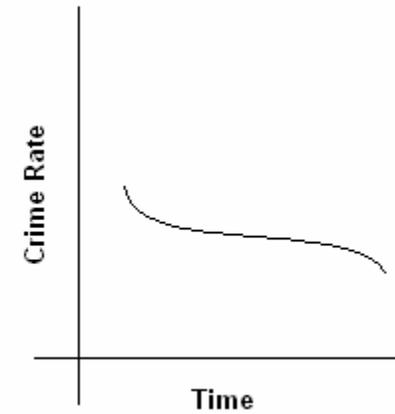
Time Series Analysis – Trend Component



No trend



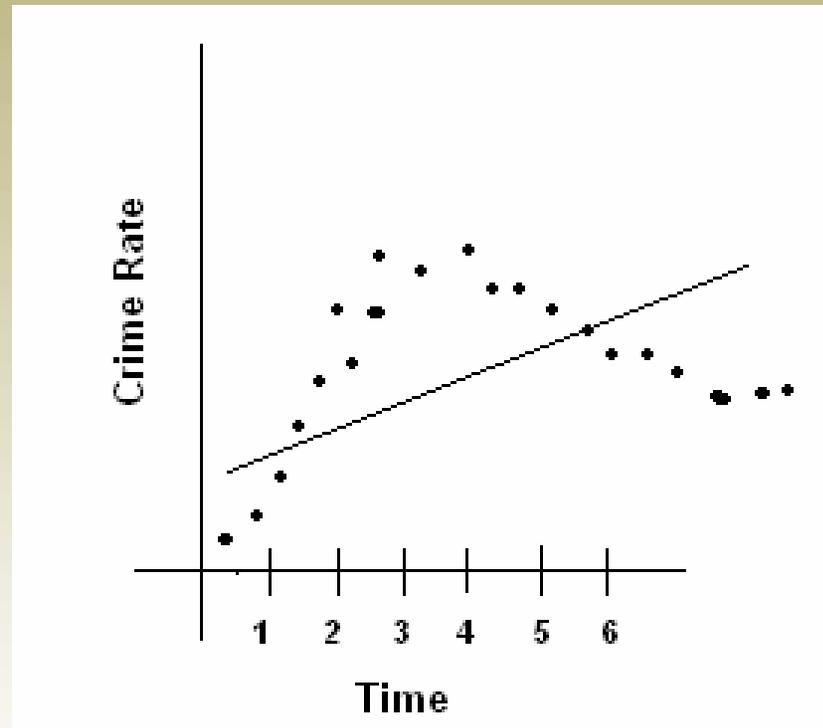
**Linearly
increasing trend**



**Nonlinear
decreasing trend**



Time Series Analysis – Cyclical Component

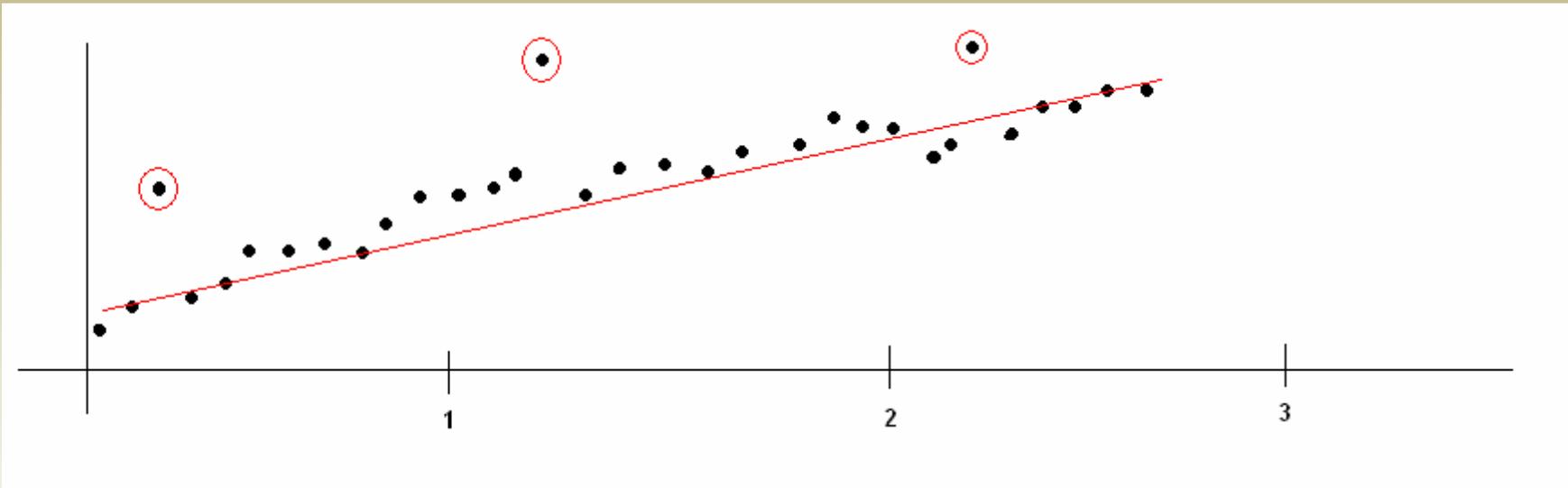


**Periods of time within the trend (if one exists)
where above/below patterns occur.**

Above or below values within one cycle last longer than one year.



Time Series Analysis – Seasonal Component



A pattern that repeats itself every year.



Time Series Analysis – Intervention Component

A single event which causes a one-time, temporary, and possibly dramatic change in the series.

In this research, Hurricane Katrina is tested as an intervention in the time series analysis of crime.

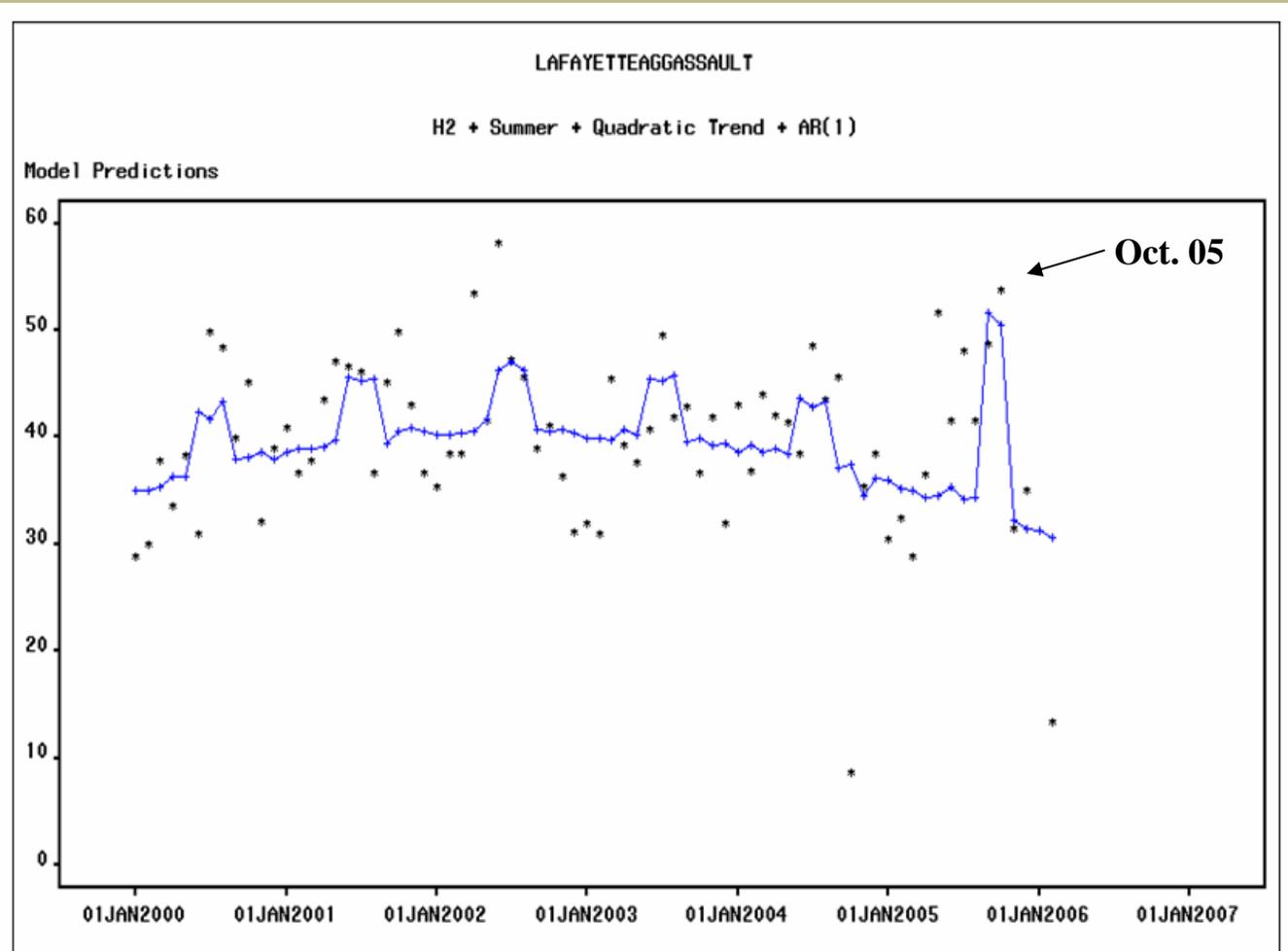
The ARIMA Model is used to test for a significant change (increase or decrease) in crime rates over time.

AR - Autoregressive Part, I - Integration, MA - Moving Average



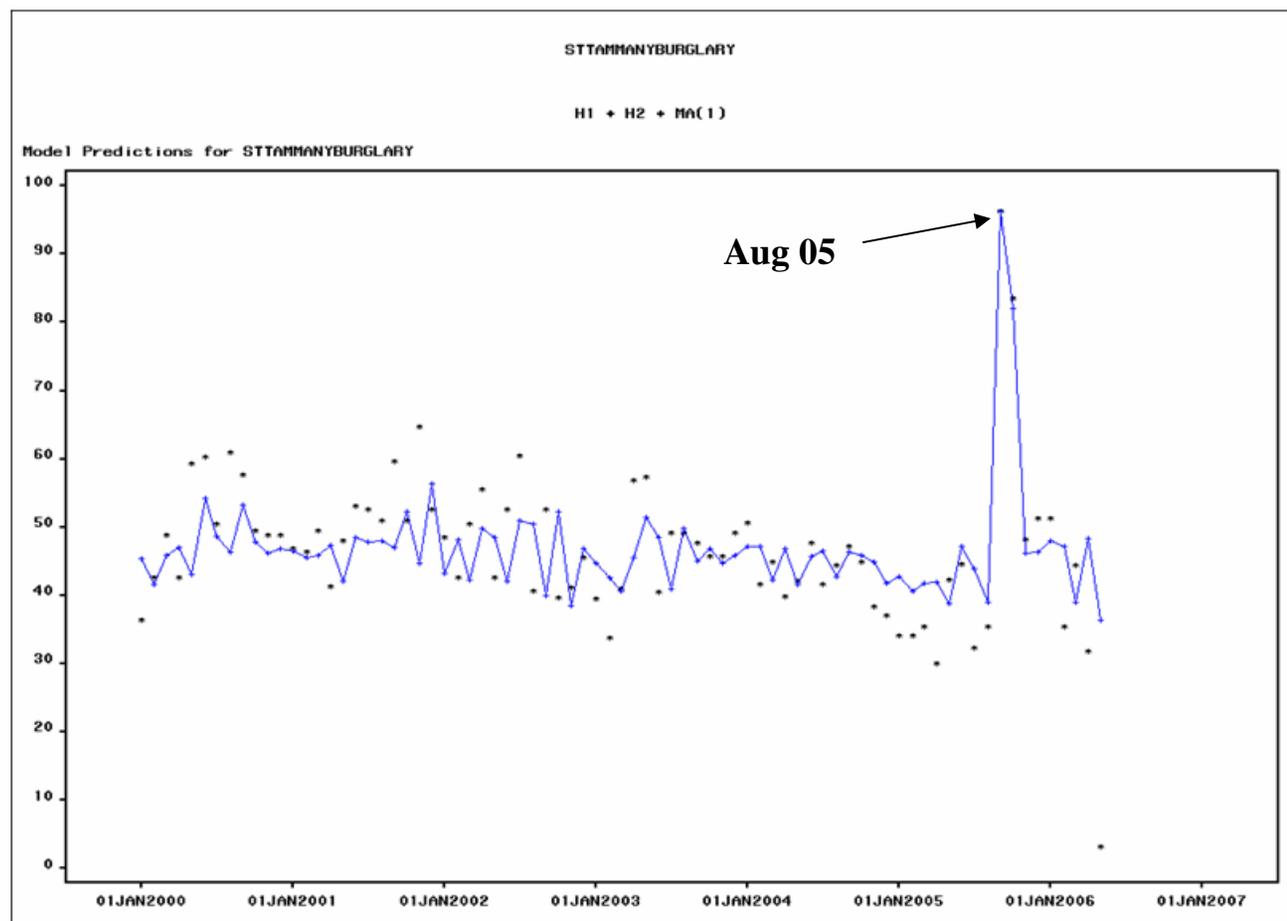
ARIMA – Aggravated Assault, Lafayette Parish

Lafayette		
	Coefficient	Significance
<i>September 2005</i>	-	-
<i>October 2005</i>	18.2223	0.0022
<i>November 2005</i>	-	-
<i>December 2005</i>	-	-
Model	ARIMA (1,0,0)	
R ²	0.2600	



ARIMA – Burglary, St. Tammany Parish

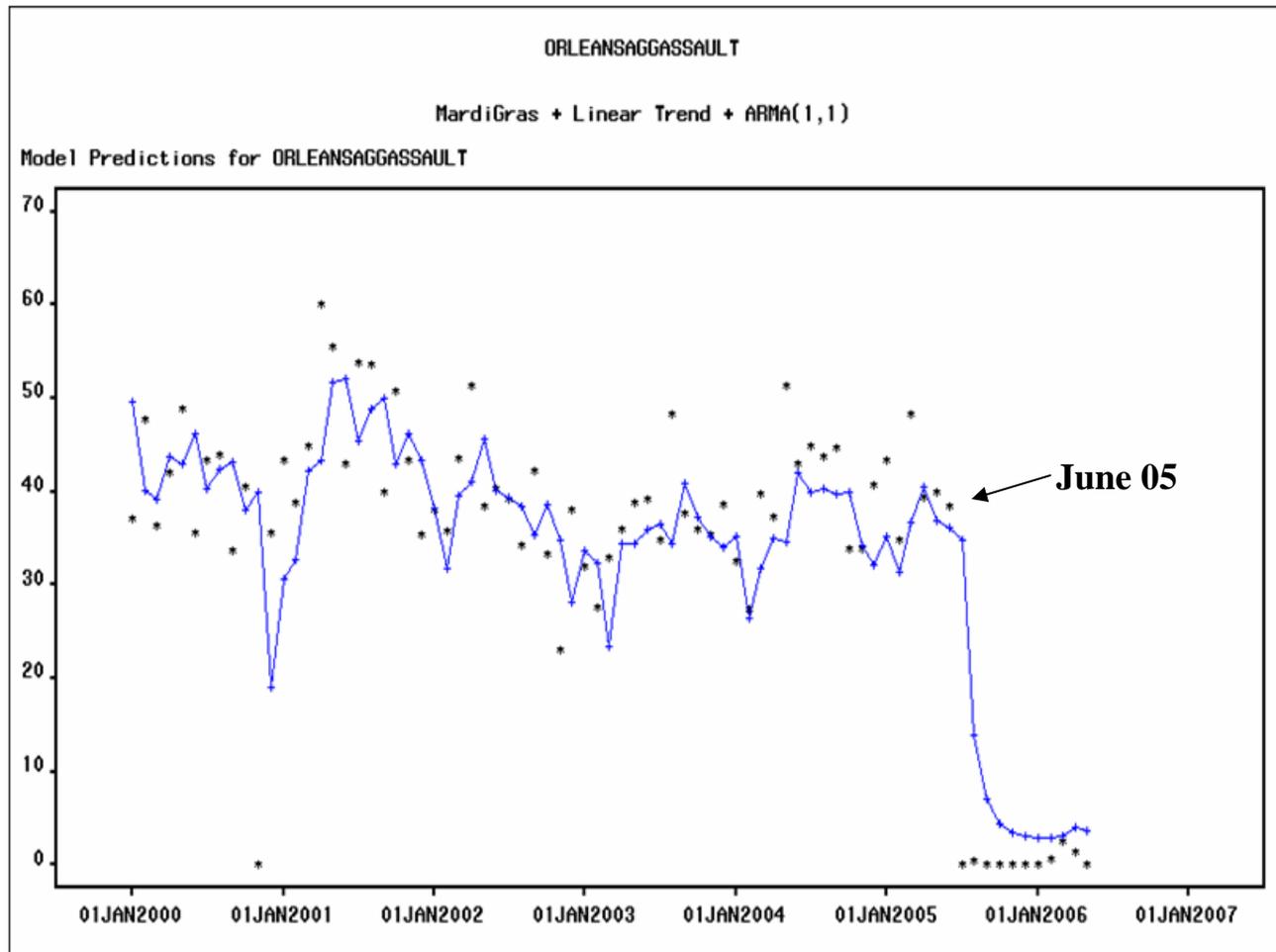
St. Tammany		
	Coefficient	Significance
<i>September 2005</i>	16.0919	0.0412
<i>October 2005</i>	36.7405	<.0001
<i>November 2005</i>	-	-
<i>December 2005</i>	-	-
Model	ARIMA (0,0,1)	
R ²	0.5180	





ARIMA – Aggrevated Assault, Orleans Parish

Orleans		
	Coefficient	Significance
<i>September 2005</i>	-	-
<i>October 2005</i>	-	-
<i>November 2005</i>	-	-
<i>December 2005</i>	-	-
Model	-	-
R ²	-	-





Summary of Results

- ARIMA is an appropriate method to detect significant changes in time series following an intervention.
- This type of research is dependent on reliable, complete and timely crime data (garbage in – garbage out).
- At this point, this study can only be conducted for individual parishes that collect and disseminate high quality crime data.



Future Research

- Collect missing and more recent crime data!!
- Recalculate crime rates with better population estimates, especially those for affected areas.
- Investigate changes in spatial patterns of crime rates pre- and post-Katrina (Rita) across all Parishes in Louisiana (e.g., look for persistent or changing crime hot spots, etc.).